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SERVING THE FRONT LINE

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## Leveraging Technology

# Report Documentation Page

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ON MY MIND

## Leveraging Technology

The NGA vision of “Putting the Power of GEOINT in Your Hands” requires the coordination of many resources. One of the most important of these is technology. This edition of the Pathfinder focuses on how we are leveraging technology to put the power of GEOINT in your hands.

We live in a world of continuously emerging technology and of proliferating data and communications tools. As we move forward to implement the NGA vision, we need to consider each of those factors. From a GEOINT perspective, it is important for us to leverage tradecraft technology and communications technology to more effectively manage, exploit and disseminate data. One mechanism for us to do so is through cooperative research agreements with industry and, as you will discover in this edition, academia.

We are being called upon to think differently, work differently and collaborate differently to meet the demands of our evolving mission set. We are being challenged to think in terms of activity-based GEOINT rather than target-based GEOINT and to explain not only where something is happening, but also why. Contextual GEOINT is what is now required. One key element of the NGA vision is to leverage technology to provide exposure of and access to geospatial information, data and intelligence. This will enable not only greater situational awareness, but also provide more data for the development of contextual GEOINT. As we at NGA rise to the challenge, and embrace the tools and technology, we will lead the way in moving GEOINT to the next level.

This issue of the Pathfinder provides some examples of how we have been doing that in the past and a picture of how we intend to continue to move GEOINT to the next level by using all of our resources, human and technological. We also highlight the online services contest held to engage the work force in implementing our vision.

Articles in this issue describe how NGA worked with Australia’s Defence Imagery and Geospatial Organisation, DIGO, to support security operations in the 2010 Commonwealth Games in New Delhi, India, and how we are using GEOINT analysis to help medical professionals in Haiti manage the cholera epidemic.

You will also learn how NGA is collaborating with the Department of Energy on a technology initiative to improve the analysis of motion imagery. This innovation is designed to help NGA’s GEOINT users receive information more quickly and enable analysts to spend less time on manual processes and more time on in-depth analysis.

This Pathfinder edition provides a glimpse into what we have done in the past, what we are doing now and how we are moving toward the future to put the power of GEOINT in your hands. As the articles illustrate, we don’t do it alone. Collaborating with GEOINT users, including other members of the defense and intelligence communities, our international allies, industry and academia to develop the right GEOINT tools and resources is essential to our mutual success, and NGA is committed to continuing on that path.



LETITIA A. LONG  
Director

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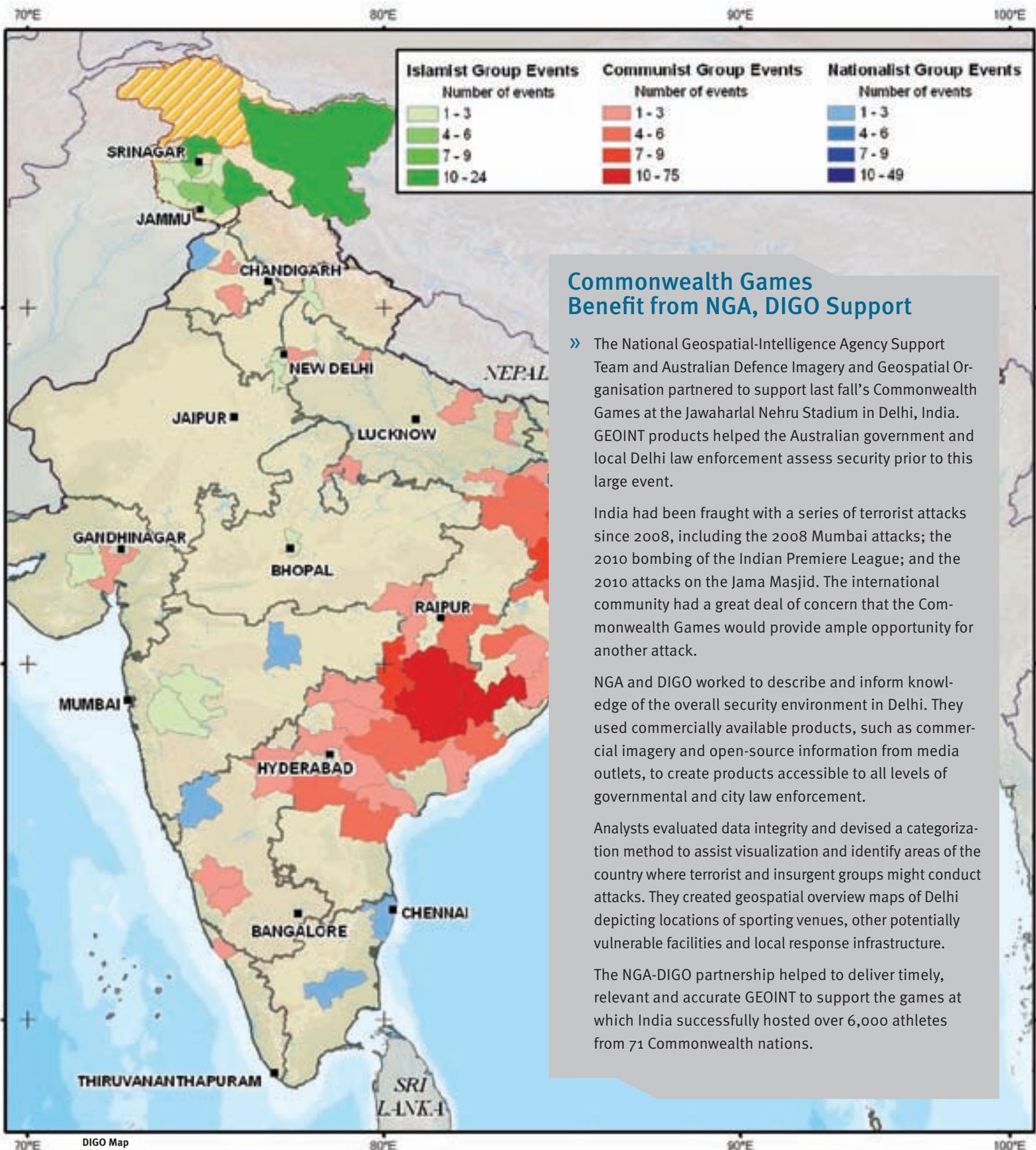
Ronald Kee

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**ON THE COVER**

The National Geospatial-Intelligence Agency continues to explore ways to leverage technology to improve situational awareness and develop contextual GEOINT. Commercial technologies are key to providing online, on-demand access to knowledge, services and content.

*Cover design by Ronald Kee using Wikimedia imagery.*



## Commonwealth Games Benefit from NGA, DIGO Support

» The National Geospatial-Intelligence Agency Support Team and Australian Defence Imagery and Geospatial Organisation partnered to support last fall's Commonwealth Games at the Jawaharlal Nehru Stadium in Delhi, India. GEOINT products helped the Australian government and local Delhi law enforcement assess security prior to this large event.

India had been fraught with a series of terrorist attacks since 2008, including the 2008 Mumbai attacks; the 2010 bombing of the Indian Premiere League; and the 2010 attacks on the Jama Masjid. The international community had a great deal of concern that the Commonwealth Games would provide ample opportunity for another attack.

NGA and DIGO worked to describe and inform knowledge of the overall security environment in Delhi. They used commercially available products, such as commercial imagery and open-source information from media outlets, to create products accessible to all levels of governmental and city law enforcement.

Analysts evaluated data integrity and devised a categorization method to assist visualization and identify areas of the country where terrorist and insurgent groups might conduct attacks. They created geospatial overview maps of Delhi depicting locations of sporting venues, other potentially vulnerable facilities and local response infrastructure.

The NGA-DIGO partnership helped to deliver timely, relevant and accurate GEOINT to support the games at which India successfully hosted over 6,000 athletes from 71 Commonwealth nations.



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## COMMONWEALTH GAMES

### Terrorist Event Reporting Jan - Jun 2010

 Gilgit-Baltistan Province  
(Pakistani-controlled)



Scale 1:18,000,000



Australian Government  
Department of Defence  
Intelligence & Security



British Embassy Photo

British Ambassador Nigel Sheinwald, at right, awarded Retired Army Chief Warrant Officer 4 Richard Black an honorary Member of the Most Excellent Order of the British Empire.

## Army Intelligence Officer Receives British Honour

Retired Army Chief Warrant Officer 4 Richard Black received an unusual award for an American intelligence officer in December—an honorary “MBE.”

British Ambassador Nigel Sheinwald awarded Black, a former Army departmental requirements officer in the National Geospatial-Intelligence Agency-led Community Support Center, an honorary Member of the Most Excellent Order of the British Empire at an investiture ceremony held at the British Embassy in Washington, D.C.

The award recognized “his exemplary individual performance and inspirational team leadership as the U.S. Exchange Officer at the Joint Air Reconnaissance Intelligence Centre, Royal Air Force Base in Brampton, United Kingdom.”

Black worked for over 25 years on GEOINT collections for the U.S. Army. In 2002, he was selected as the first warrant officer for the JARIC exchange position.

During his JARIC tour, Black worked with the NGA Support Team to enhance GEOINT sharing across the NGA, Commonwealth and U.S. unified military commands. According to the citation, “his experience in imagery intelligence, especially collection methodologies, exploitation techniques and the dissemination process, proved invaluable to JARIC.”

Black is also a past winner of the Medmenham Trophy, awarded annually by the World War II photographic interpreters Medmenham Club to the service or civilian imagery analyst who is adjudged to have made the most outstanding contribution to imagery intelligence during the preceding year. He is the only American to have won the trophy since it was first awarded almost 50 years ago.

Black retired from the U.S. Army in August 2010.



Photo by Christine Kuppens, SENSE Solutions

Steve Heller, Professional Certified Coach and President, International Coach Federation, Metropolitan Washington, D.C., chapter, presents Judy Wolf (at left) the Prism Award in recognition of NGA's focus on leadership coaching.

## NGA Honored with Leadership Coaching award

The National Geospatial-Intelligence Agency received the 2010 Prism Award for excellence in leadership coaching initiatives from the International Coach Federation Metro D.C. Chapter.

The Prism Award, presented during a ceremony held Feb. 11 at the Capitol Hilton, “highlights the impact of coaching on business results and employee performance,” according to an ICF statement. “It is presented to the organization that has shown the most commitment to and support of leadership coaching initiatives over the past year.”

“NGA’s coaching program is a key tool for developing our leaders,” said NGA Director Letitia A. Long. “This program helps to enhance the leadership capabilities of our Agency and is an important investment in our work force. Not only am I a strong supporter of our coaching program, I personally participate.”

## NGA Team Member Selected as Finalist for 2010 Galileo Awards

National Geospatial-Intelligence Agency team member Michael P. Egan was recognized Jan. 24 by Director of National Intelligence James R. Clapper Jr. as a finalist for the 2010 Galileo Awards.

Egan, a supervisory project scientist with NGA’s InnoVision Directorate, was selected as one of eight finalists and three winners out of 95 submissions from across the community for his paper entitled, “Rejuvenating the Intelligence Community: Reversing the Effects of Bureaucratic Middle-Age.”

“We are always concerned about how we maintain our technological edge,” Egan said. “When we look at advances going on outside of the IC then look at some of the processes we are saddled with within, we can see that we lack some of the freedoms that real innovation requires,” he said. “To remain relevant, we have to look at how we provide new technologies to the user.”



NGA Photo by Tony Boone

# NGA Announces Online Services Contest Winners

BY REISHIA KELSEY

## Letitia A. Long, Director of the National

Geospatial-Intelligence Agency, initiated an online services contest to challenge the work force to take GEOINT to the next level and fundamentally change the user experience.

The online services contest was open to the entire NGA work force, including contractors and other government employees. More than 50 teams, including over 500 individuals, participated in the contest.

A panel of judges selected the winners—Ender’s Battle School and the A-Team—in early February.

Both winners offered full-scope online solutions that will ideally make NGA’s GEOINT knowledge easily accessible and more intuitive for its mission partners and end users.

“The ultimate goal of the contest was to provide a platform that generated ideas and enabled the work force to contribute to the vision in a way they never had before,” said Long.

Living Intelligence, the runner-up, proposed social software tools for knowledge management and information sharing that will enable greater clarity and transparency within NGA and across the broader Intelligence Community.

“There was a tremendous response from the work force,” said NGA’s newly appointed Vision Implementation Team Lead Mary M. Irvin. “From my vantage point, our work force has been waiting for an opportunity to reassess our capabilities and leverage existing technology solutions to make our online services easier, faster and better.”

Teams were tasked to notionally define NGA’s future Web presence and to be able to demonstrate a substantial portion of their proposed online capabilities at the 2011 GEOINT Symposium that will be held in San Antonio, Texas, Oct. 16-19.

Through several rounds of judging, the more than 50 teams had been pared down to seven



*Retired Coast Guard Adm. Thad W. Allen, at left, makes a point during the panel judging as fellow panel judge Randy Fort, former Assistant Secretary for Intelligence and Research, State Department, listens.*

NGA photo by Tony Boone

finalists based on the following criteria:

- improved quality of the user experience;
- viability of the proposed implementation strategy; and
- scalability of the online capabilities across multiple environments.

The seven finalists presented to a distinguished panel of judges that included Long; Retired Coast Guard Adm. Thad W. Allen; Dr. Tom L. Allen, Deputy Director for Force Management, Joint Chiefs of Staff; James Danoy, National Intelligence Manager for Europe, office of the Director of National Intelligence; Army Maj. Gen. Michael T. Flynn, Special Assistant to Deputy Chief of Staff; Randy Fort, former Assistant Secretary for Intelligence and Research, State Department; and Dr. Michael Wertheimer, Director for Research, National Security Agency.

Building on the momentum of the vision and the excitement generated from the contest, the Vision Implementation Team plans to engage with the

50-plus teams. “We now have a portfolio of viable ideas to help reinvent our online presence,” said Keith A. Barber, the Implementation Lead for On-demand Services.

John A. Goolgasian, the Implementation Lead for Analytic Depth, stated that overall the teams showcased NGA’s creativity, ingenuity, enthusiasm and diversity.

The Vision Implementation Team’s next step is to bridge the cultural gap between the digital natives—people who grew up with computers and electronic technology, and digital immigrants—those who have had to adapt to and learn computer technology and social media tools as adults.

“Non-material solutions have to be addressed in order to make any technology implementation suc-

cessful,” said Marshall B. Harper, Implementation Lead for Enterprise Development. “Technology is the easy piece; changing the mindsets of the folks using the technology is crucial to the actual implementation of the vision.”

Looking ahead, NGA’s first-ever online services contest has empowered the work force to take GEOINT to the next level and put the power of GEOINT into your hands. P

Reishia Kelsey is a public affairs officer in the Office of Corporate Communications.

Members of the Vision Implementation Team and a distinguished panel of judges meet during the final round of contest judging. Seven finalists presented to the panel, who selected the winners—Ender’s Battle School and the A-Team.

NGA photo by Tony Boone





# Persistics: A Revolution in Motion Imagery Processing

BY ROGER GANT

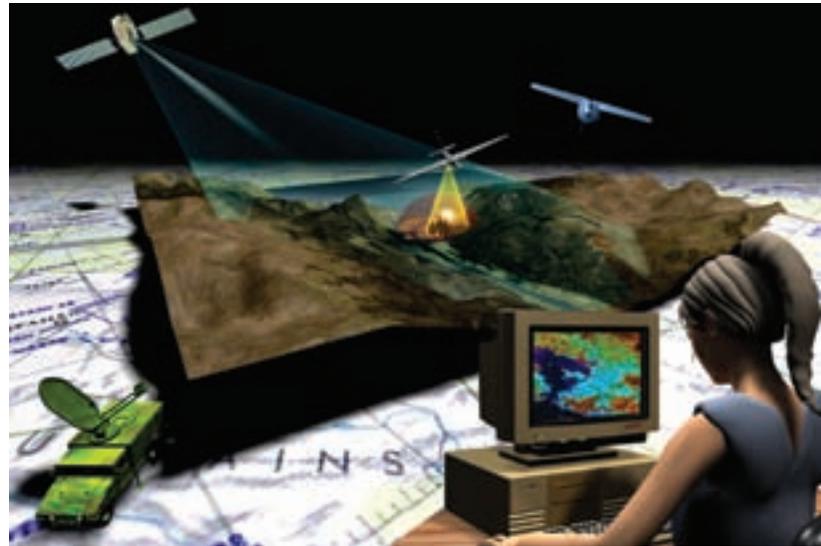
**As technology continues to steadily multiply** the amount of information available from current and future intelligence sensors, how can analysts expect to keep up? More importantly, how can they make the leap from analyzing discrete events to fully understanding the larger patterns of activity that battlefield commanders need to conduct asymmetric warfare?

The National Geospatial-Intelligence Agency's InnoVision Directorate is quietly enabling that leap today in the realm of motion imagery—an increasingly valuable source of information for users, whether they're confronting the Taliban in Afghanistan or tackling natural disasters in the United States or elsewhere. Through an advanced data processing initiative called "persistics," analysts will be able to apply automation to exploit large swaths of wide-area motion imagery and improve their ability to perform activity-based analysis. Automated processing techniques within persistics will significantly reduce the amount of motion imagery that analysts need to search, retrieve and display on their workstations.

Persistics is a partnership success story between NGA and the Department of Energy's Lawrence Livermore National Laboratory. According to John Rush, InnoVision liaison to the NGA Office of Defense, the initiative represents a fundamental change in processing that has the potential to significantly advance geospatial intelligence analytical tradecraft.

"With motion imagery, it's the motion that's important—not the imagery," Rush said. "Handling wide-area motion imagery like traditional imagery quickly overwhelms communications and storage."

The Persistics effort is aimed at reducing the data handling burden on networks, servers and the analyst. It does so by separating the movement in a video scene from the unchanging background. The process reduces the time needed to analyze motion imagery from



*The Persistics initiative hopes to revolutionize motion imagery's contribution to "activity-based" analysis.*

NGA photo illustration by Christina S.

hours—or days—to just minutes by relieving analysts of the task of manually creating tracks of thousands of moving objects.

The Persistics initiative is particularly timely now. Today, motion imagery analysts primarily exploit narrow-field-of-view systems like the full-motion video data from the MQ-1 Predator, which covers a small area and small number of movers at a time. Current WAMI systems, such as Constant Hawk, already have the ability to image thousands of movers, and future wide-area systems will potentially track millions of movers as areas of coverage and mission durations increase. Today's legacy processing simply can't begin to exploit the volume of data and provide analysts with the right information. As a result, analysts spend many hours manually extracting individual mover tracks from wide-area motion imagery.

Persistics uses a process called dense correspondence, which results in very stable imagery. As a wide-area surveillance platform flies a typical orbit, data is collected through a system of



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multiple cameras, creating very large data sets (one terabyte an hour for existing sensors like Constant Hawk). Dense correspondence processing algorithms separate the movers in the data stream from the stable or unchanging background. Movement data is then streamed back to users along with periodic updates of the unchanging background. This radical processing enables persistics to reduce the amount of data needing to pass through communication paths, to the analyst and eventually into storage, by more than 1,000 times.



Rush credits the genius behind persistics to LLNL's team, with whom NGA InnoVision launched the project two years ago. In particular, Rush cites Dr. Sheila Vaidya, LLNL's program manager, for her scientific acumen.

"Sheila leveraged the lab's experience in processing large data sets associated with astrophysics, so we could apply it to warfighter needs," said Rush. "Some seriously big brainpower went into getting persistics where it is today. They're a phenomenal team."

Persistics' features include an ability to stabilize imagery and eliminate scene jitter, parallax and other image imperfections common in existing WAMI data. In addition, it facilitates 3-D extraction, which—literally—adds a new dimension to analysis. These features represent a significant leap forward in the concept of activity-based GEOINT.

"Traditionally, every pixel was transmitted, analyzed and stored," said Rush. Persistics allows the analyst to see the pixels that change to observe the activity of actors and entities (the movers) over long periods of time. Activity reveals relationships between movers and specific locations and leads to greater context and knowledge about specific objects and their environment. That's what activity-based GEOINT is all about. Through automation, InnoVision is turning the challenge of motion imagery volume into an information advantage for the analyst.



Persistics is on track for transition to the user community over the coming year. NGA's InnoVision Directorate is collaborating with the Army Research Lab on the deployment of a persistics ground processing capability for the Constant Hawk airborne collection platform by next summer. InnoVision is also leading an effort in support of the Department of Defense Intelligence, Surveillance and Reconnaissance Task Force and the U.S. Air Force to modify the processing chain to accommodate the data from the Defense Advanced Research Projects Administration's Autonomous Real-Time Ground Ubiquitous Surveillance Imaging System sensor, which is expected to be fielded on the MQ-9 Reaper Gorgon Stare II system.

The technology inherent in persistics offers an opportunity to industry, Rush said. "Once the prototype is available, we plan to make the technology available to sensor system and exploitation tool developers for broader application across the community. This is a great way for NGA to exercise functional management through our partnership with industry."

Persistics, at heart, is all about adding relevance to motion imagery at a time when more data is available than ever before. By automating activity detection, enhancing standards, facilitating fusion and advancing tradecraft, motion imagery is made more intuitive. InnoVision is proving that, with the right processing techniques, the richness of large motion imagery data sets can be fully exploited by automatically capturing the essential elements of movement in a greatly reduced format. In today's increasingly data-rich environment, the power of persistics will allow the National System for Geospatial Intelligence to harness the full potential of motion imagery and in doing so significantly advance the power of GEOINT. 

*Roger Gant is a contract employee supporting the InnoVision communication team.*

# Cooperative Research and Development Agreements with University Set to Yield Valuable Results

BY JAN LEWIS, JIM VRABEL, ART COBB AND JOANNA D.

**As the U.S. government continues to tighten** its belt, entering agreements to leverage brainpower and resources from non-federal entities has become an increasingly valuable tool for the National Geospatial-Intelligence Agency.

Facing the challenge of reduced budgets head-on, NGA's InnoVision Directorate has placed renewed emphasis on a program that allows NGA to partner with non-federal organizations that are leaders in their fields without any funds changing hands. Via cooperative research and development agreements, more commonly known as CRADAs, InnoVision allows partners insight into emerging capabilities, data, data standards and processes, and access to classified information and tools. NGA gains hands-on access to leading-edge products, research and services.

Recently, InnoVision signed two CRADAs with an academic institution, instead of industry partners (as it has historically been), marking a major milestone in the program. On Jan. 6, 2011, a signing ceremony was held at The Pennsylvania State University to formalize them.

Scott Webster, Director of the InnoVision Advanced Development Office, and Dr. Hank Foley, the Vice President for Research at The Pennsylvania State University, signed two CRADAs:

- NGA and PSU Dutton e-Education Institute;
- NGA and the PSU Applied Research Laboratory

The activation of these CRADAs marks the first time the NGA CRADA Program has partnered with an academic institution or a university-affiliated research center.

PSU is recognized as one of the leading educational institutions in geospatial curricula because of their geospatial analysis program. Accordingly, the focus of the CRADA between NGA and PSU Dutton e-Education Institute is "Improving the Teaching of Geospatial Analysis." This CRADA relationship will expand upon NGA's existing research into optimal training and educational means that will improve the spatial ability and analytic skill of geospatial intelligence analysts working as part of an intelligence team. The outcomes of the CRADA are expected to enable NGA to identify development opportunities that support recruitment and retention of GEOINT analysts.

*The researchers and managers from NGA, the Pennsylvania State University Dutton e-Education Institute and the PSU Applied Research Laboratory gather at the university.*  
Penn State University photo



Dr. Todd S. Bacastow, Professor of Practice for Geospatial Intelligence at the PSU Dutton e-Education Institute, stated his views on the impact NGA has on its geospatial program: “NGA is the premier geographic organization in the world and the thought-leader in the discipline. NGA is an active employer of students from the Penn State Department of Geography’s resident program. And finally, 95 percent of the students in our online geospatial intelligence program work with or for NGA.”

Participation in this CRADA will strengthen the relationship between NGA and PSU.

The CRADA between NGA and the PSU Applied Research Laboratory has two focus areas: improvements to hyperspectral processing and to the Urban Terrain Zone product suite.

The Hyperspectral Processing Program will conduct research into the application of advanced target detection algorithms to NGA targets of interest. The program outcomes will provide a base from which NGA can expand hyperspectral exploitation efforts to include new algorithms and processing, and this technology will act as a catalyst for additional development that could result in a commercial product.

The Urban Terrain Zone Program research will provide a base from which NGA can expand its product suite to better serve current users in the operational environment. Resulting data visualizations will illustrate UTZ utility for a range of applications supporting NGA priorities. The CRADA research efforts will include the generation of a combined UTZ and light detection and ranging product, the definition of UTZ information to support urban operations and a new product definition supporting the NGA mission.

Shawn Hough, ARL Geospatial Technology Department Head, describes his excitement for entering into this CRADA with NGA: “ARL/PSU has had a long-term relationship with NGA through several short-term contracts; the CRADA allows our laboratory to have a continual relationship for the next five years



*Dr. Hank Foley, Vice President for Research at Pennsylvania State University, and Scott Webster, Director of the InnoVision Advanced Development Office, signed a cooperative research and development agreement on Jan. 6, 2011.*

**Penn State University photo**

by creating new avenues for interaction.”

The NGA CRADA Program, led by Michael O’Brien, has grown steadily in the last few years.

Said O’Brien, “As NGA organizations become aware of the great benefits that can be realized through participation in a CRADA, they are more willing to dedicate the resources needed for management of the CRADA.”

CRADAs represent a strategic opportunity to pursue cutting-edge research and development initiatives.

NGA now has 17 active CRADAs with several others in development.

NGA’s first CRADAs were activated in 1999 with industry partners ESRI, ERDAS and ObjectFX. Participation in these CRADAs allows NGA to influence the development of commercial-off-the-shelf tools used daily by NGA’s Analysis and Production Directorate as well as the National System for Geospatial Intelligence community. **P**

*Jan Lewis, Art Cobb and contract employee Jim Vrabel are members of the InnoVision Industry Outreach Division, Cooperative Research and Development Agreement Team. Joanna D. is a contract employee supporting the InnoVision communication team.*





## NGA in Haiti: Combating Cholera With GEOINT

BY BILL BYRNE

**Over a year after a 7.0 magnitude earthquake** struck Haiti, one of the world's most impoverished nations, Haitian citizens are facing another crisis—cholera.

As with the earthquake, the National Geospatial-Intelligence Agency is on hand to help deal with this latest calamity.

From October 2010 through February 2011, an estimated 4,500 Haitians died from cholera. The Haitian Ministry of Public Health and Population estimated that more than 231,000 cholera cases have been recorded since the October outbreak.

NGA's contribution to the anti-cholera campaign is largely transparent. Nevertheless, the monitoring, tracing and marking of unrest and cholera's footprint are critical factors in the combined effort.

According to the chief of the Analysis and Production Directorate's Cuba/Caribbean Branch, the single, "...most important value-added aspect of the NGA contribution is the analysis of the visual representation of the medical reporting."

"We are looking for patterns that may indicate how the cholera is spreading and where it may spread next," he said. An example of this geospatial mapping of the cholera outbreak area revealed that the educational efforts in the internally displaced person camps are largely successful; the cholera outbreak has primarily been located outside of the densely populated camps.

At the most fundamental level, NGA brings the following to the ongoing anti-cholera campaign: monitoring and confirming the implementation of purpose-built cholera treatment centers and signs of unrest in the crowded IDP camps.

Spontaneous unrest is a constant threat in communications-poor Haiti. Rumor mongering is rife. For example, until October 2010, cholera had not been detected in Haiti for more than a century. However, in late November, rumors began that the cholera had been introduced to Haiti by a recently arrived contingent of Nepalese troops, part of the 12,000 person U.N. Stabilization Force. At the time, Nepal was experiencing a cholera outbreak. Violent anti-U.N. rioting left three dead in Haiti's second city of Cap-Haitien.

The issue of whether the cholera was introduced from outside Haiti remains unresolved. The argument over the origins of Haiti's cholera is not productive, for in the words of Stefano Zannini, Chief of the Haiti mission for Doctors Without Borders:

"One person is dying every 30 minutes in Haiti. Knowing the origins of the epidemic has no impact on saving lives."

The cholera originated in the northwest quadrant of Haiti in the agricultural lands of the Artibonite River Basin. Cholera is largely waterborne and breeds in unclean water. Not surprisingly, northwestern Haiti is a land of rivers, canals, ponds and rural poverty.

DOD Photo



Bodies of water are used by everyone for all possible human and agricultural activity. The disease is spread through fecal-contaminated food and water. The result is vomiting and diarrhea that can quickly lead to severe dehydration and death. In the Artibonite, rice is the principal crop and grows in rice paddies. From the Artibonite, cholera-infected victims traveled south along the coastal highway to Port-au-Prince.

By early November, 120 suspected cases were reported in the capital of Port-au-Prince. Of these people 114 were from the Cite Soleil, the sprawling oceanside shantytown at the northern edge of the capital and the closest urban point to St. Marc, the cholera's center in Artibonite.

NGA is helping to identify areas of standing water in the IDP camps that could be potential sources of fouled water.

The agency does not suggest locations for portable water stations; however, NGA does monitor the ongoing rebuilding efforts in Haiti. These include building structures, telecommunication infrastructure, communication lines, seaports and airports. Since cholera broke out in October, the NGA Support Team's main effort has been on cholera treatment centers, which are purposely built for cholera patients.

Haiti and the Dominican Republic share the island of Hispaniola. Relations between the two island states can best be described as correct, but have been strained and violent in the past. While NGA monitors Haitian IDP migration at the Dominican-Haitian border crossings, the cholera has leached eastwards across the border and spread within the Dominican Republic. As pointed out by the Centers for Disease Control and Prevention, the course of cholera in Haiti is difficult to predict.

While reports of new cases have declined, according to U.N. health officials the emergency is not over. The death rate in the remote rural interior remains very high. The Haitian population has no preexisting immunity to cholera, and environmental

conditions in Haiti are favorable for its spread. More than a million Haitians remain in IDP camps, but the capacity of IDP camps to provide centrally treated potable water, adequate sanitation, hand-washing stations and health care varies. Cholera may persist in Haiti's future, but NGA has played and will continue to play a role in stamping out the deadly cholera outbreak there. **P**

*Bill Byrne is a public affairs officer in the Office of Corporate Communications.*

DOD Photo



## Time and Navigation—NGA Contributes to Exhibit on the National Mall

BY JOANNA D.

**Hip pack-clad, camera-toting Washington, D.C.,** tourists will experience something new on the National Mall in 2012. At that time, NGA employees and others can bring their holiday visitors to the Smithsonian's National Air and Space Museum to see an all-new 5,000-square foot exhibit on the history of two modern conveniences: timekeeping and navigation.

NGA is a major contributor to the exhibition, complementing its role in global navigation.

Titled "Time and Navigation," this exhibit—a collaboration of the National Air and Space Museum and the National Museum of American History—will focus on the history of time and navigation; navigation at sea, in the air and in space; the invention of satellite navigation; the role of time in modern navigation techniques in modern life; and navigation challenges that still remain to be solved.

NGA and its predecessor agencies have been heavily involved in satellite navigation systems since the 1960s. The Defense Mapping Agency, for example, used the Navy Navigation Satellite System to develop a series of what are called global geospatial reference frames such as the World Geodetic System 1972 and World Geodetic System 1984. These global reference frames are the foundation of any global navigation system.

When GPS, the Global Positioning System, was created in the 1980s, DMA played a key role in its development. NGA continues to rely on GPS as a vital component of virtually all geospatial products, many of which are directly used for navigation and positioning. For this and other reasons, NGA was invited in 2009 to contribute to this groundbreaking exhibition.

The Smithsonian Institution is a quasi-governmental organization that receives 75 percent of

its funding from the U.S. government and the rest from trusts, endowments and contributions from industry and other government agencies for specific projects. As one of nine government and industry sponsors of the exhibit, the Smithsonian will give NGA public name recognition, to include on the donor's plaque at the exhibit's entrance.

The Smithsonian Time and Navigation exhibition Web site will contain hyperlinks to content on the NGA Web site related to the exhibition themes and educational goals. This exposure will provide greater public understanding of the agency mission and encourage interest in science, technology, engineering and mathematics, the essential foundation for all future engineers and scientists.

NGA's senior scientist for geodesy and geophysics, Steve Malys, has been leading the effort for NGA since the relationship with the Smithsonian began in 2009. Malys and the InnoVision team have engaged with others throughout NGA to coordinate and deliver NGA's input from a single voice.

Said Malys, "NGA is proud to support this exhibition, which will trace a story that began with early mariners navigating with the aid of the sun, moon and stars, to modern satellite navigation systems."

The exhibit is planned to be on display for a minimum of five years but will likely last 10 or more years before retirement.

Added Malys, "With a visitor count of more than 7 million people per year at the National Air and Space Museum and an online visitor count approaching 11 million per year, we are certain to improve the public's understanding of global navigation and encourage young visitors to pursue a geospatially oriented career." P

*Joanna D. is a contract employee supporting the InnoVision communication team.*



# NGA Marks Milestone in Move to New Headquarters

BY LAURA LUNDIN

**The National Geospatial-Intelligence Agency** marked a significant milestone in January when its first employees moved into the agency's new 2.4 million square-foot campus at Fort Belvoir's North Area in Springfield, Va.

The move is the first deployment of NGA mission personnel to result from the consolidation of the agency's facilities in the Washington, D.C., metropolitan area to a single location due to 2005 Base Realignment and Closure requirements.

"With this milestone achievement, NGA will begin to enhance organizational continuity across the nation and around the world, while promoting even greater mission effectiveness everywhere we work," said NGA Director Letitia A. Long.

The campus was purposely designed to facilitate greater collaboration both within NGA and with mission partners and customers supporting the

geospatial intelligence mission around the world. The campus will accommodate 8,500 people while allowing for future growth.

"The physical facilities are at the leading edge of the Intelligence Community, and the collocation of NGA's East components will greatly expand the possibilities to both enhance mission performance and promote community collaboration," said Director of National Intelligence James R. Clapper Jr.

NGA's move to its new headquarters is being conducted in increments and will be completed in September 2011.

"I remain proud of what NGA has accomplished, and I know we have even greater opportunities ahead of us to contribute to our nation's continued security," Long said. "NCE will help everyone at NGA ensure mission success long into the future." **P**

Laura Lundin is a public affairs officer in the Office of Corporate Communications.



*A member of the NGA Campus East reception team provides directions to an employee on his first day at his new office in Springfield, Va. NGA employees began the move-in Jan. 18 and will continue to move into the facility, located at Fort Belvoir's North Area, through September*

NGA photo by Tony Boone



# Afghanistan: Between Spring Offensives and Silent Spring

BY DOUGLAS BATSON

**Military geographers are rebuilding the** government of Afghanistan's capacity to address environmental concerns.

NGA signed a Basic Exchange and Cooperation Agreement with the Afghan Geodesy and Cartography Head Office in June 2007. NGA has since provided onsite mentoring to AGCHO personnel on modern digital cartographic production, geodetic systems and processes and management of geographic names.

With NGA's guidance AGCHO is producing new map products in the local language to support the Afghan National Security Forces, a critical goal of NGA and AGCHO's engagement. In addition, NGA has had success in assisting AGCHO and other Afghan government bodies to stand up the Board on Geographic Names-Afghanistan, which will operate similarly to the U.S. Board on Geographic

Names. The board had the challenging mission of standardizing place names.

Afghanistan is home to decades of human misery, war, millions of refugees and a failed state that remains the flash point of the U.S.-led overseas contingency operations. In Afghanistan NATO's credibility is at stake as its members struggle with reconstruction and stability operations and simultaneously battle a tenacious insurgency. The protracted human conflict has degraded the natural environment to the point that, even if the insurgency were quelled, Afghanistan faces "a future without water, forests, wildlife, and clean air," according to the United Nations Office for the Coordination of Humanitarian Affairs.

The case of Kelegay illustrates how a degraded environment thwarts U.S.-led reconstruction and stability efforts in Afghanistan. From 1990 to 2006,

*Villagers review a commercial satellite image of pasture land parcels.*

Photo courtesy of Terra Institute



Kelegay was an empty, dusty plain; it was the site of an old Soviet military base with an abandoned village of broken walls cutting across untended fields. Now frantic construction is under way.

The building boom began when the entire population of a ruined village came back after 26 years as refugees in Pakistan. Because of their increased numbers as a new generation, they occupied government land well beyond their original village and fields. Within a week, the returned villagers began dividing up the land parcels and buildings.

“This is our ancestral land; our forefathers lived here,” said Haji Abdul Jabar as reported in a New York Times article. Jabar was building a large compound to house his family and those of his seven brothers.

But what will the Jabar brothers find when they attempt to return to their ancestral livelihoods of agriculture and animal husbandry?

While “over 80 percent of Afghan people live in rural areas, they have seen many of their basic resources—water for irrigation, trees for food and fuel—lost in just a generation,” noted a U.N. Environment Programme report. In a 2007 report titled Sustainable Land Management, the Afghanistan’s Ministry of Agriculture and Food portends grave consequences if the government and international aid organizations continue ignoring the country’s degrading environment.

Soil fertility is declining, salinization is on the increase, water tables have dramatically fallen, and de-vegetation is extensive. More than 80 percent of Afghan land is subject to wind and soil erosion. Over 70 percent of forests throughout the country have been lost since 1985. One of the immediately visible humanitarian implications of deforestation is the country’s increasing vulnerability to natural disasters, namely flooding and landslides. The eradication of Afghan forests explains why deserts have been rapidly expanding.

Thus the Jabar brothers will likely find it impossible to cultivate land that has become infertile and arid. Their scores of sons, who knew nothing of agriculture and livestock as refugees in Pakistan, will flock to the cities to seek out an existence in the peri-urban slums. Without a home or means of support, they are predisposed to recruitment by the purveyors of instability: crime bosses, narco-traffickers and the Taliban. The stark population to natural resource imbalance thwarts reconstruction efforts altogether and foreshadows renewed conflict in Afghanistan, this time over access to natural resources for subsistence and survival as opposed to over ideology.

Decades of war, drought and neglect have blurred or totally incapacitated responsibility for Afghanistan’s natural environment. A cadastre (land and property registry) can visibly link environmental needs to human needs. And via the BECA, AGCHO’s Cadastral Division will be poised to register its human terrain, namely, recording restrictions on environmentally harmful practices and tying a personal or organizational name to responsibility for environmental stewardship. With an increased focus on geography in Afghanistan’s reconstruction, that beleaguered country’s future need not lie between insurgent spring offensives and silent spring.

Note: Silent Spring is the title of a 1962 book by Rachel Carson that raised environmental awareness and sparked the ecology conservation movement in the United States. A John Keats poem, La Belle Dame sans Merci, which describes a desolate place where “no birds sing,” inspired the book’s title. **P**

*Douglas Batson is a political geography analyst and a staff member to the Foreign Names Committee of the U.S. Board on Geographic Names.*

# Social Media Enhance Collaboration Across the NGA Enterprise

BY KATHERINE WHITAKER

**For the National Geospatial-Intelligence Agency,** social media communication tools play a critical role in collaboration with professionals across the Intelligence Community. From Jabber to Intellipedia, these tools are changing the way they communicate.

“Efforts to build bridges of communication and trust among intelligence, homeland security, law enforcement and overseas partners give policy-makers and first responders the support they need to prevent tragedy,” said Director of National Intelligence James R. Clapper Jr. in a recent message to the intelligence work force.

Social networking tools aid in this mission by enabling intelligence professionals to share information on common projects with hundreds of users, over several networks, without regard to location or agency, in near-simultaneous fashion.

“From a GEOINT [geospatial intelligence] perspective, the ability to develop intelligence and share it with a large amount of people throughout the IC is invaluable,” said the team lead with NGA’s Horn of Africa Branch in the Analysis and Production Directorate.

The interactive display offered by social media forums provides geographically dispersed users with a common venue to obtain situational awareness. Maps, photographs, videos and information are updated regularly by users, enhancing the view of the topic or situation.

Embedded links can connect related articles and topics, increasing the value of the knowledge base and improving the discoverability of information.

Intellipedia is a popular social media forum for intelligence professionals. Operating similarly to Wikipedia, Intellipedia relies on members of the IC to post information for discussion or use by others. Unlike Wikipedia, users must have an account to edit information, which allows for accountability and attribution and lends credibility to the collaboration and analysis.

The collaboration operations lead with the Joint Operations Integration Office, along with her team and representatives from other IC agencies, recognized the need for a standard IC collaboration tool suite. Together they used Intellipedia to build a community policy recommending appropriate social networking tools. The policy, which the Director of National Intelligence approved in just four weeks, gives IC agencies access to the same tools and facilitates seamless collaboration.

Having many eyes on products is especially valuable for time-sensitive issues. For example, an analyst might have a question that would benefit from multiple responses from many agencies. While this process might take weeks using traditional channels of e-mail and phone call, social media tools allow users to work simultaneously in real time.

A benefit to working in the IC is the ability to move from job to job within an agency and potentially within other government agencies as well. But sometimes when people move on, their knowledge moves with them. Intellipedia and other social media forums help protect information from “walking out the door” since information posted remains available and searchable, indefinitely, until it is manually deleted.

Another collaboration IC members use is IC Connect.

“IC Connect has become a critical tool in connecting users who are separated geographically,” said the collaboration operations lead. “It allows users to join a synchronous, virtual world that provides audio, video, desktop sharing and chat.”

The platform offers a real-time, Web-based presentation tool to create information and general presentations, online training materials, Web conferencing, learning modules and user desktop sharing. Each participant can see what is happening on the presenter’s computer screen.

IC Connect makes team meetings and training sessions simple by allowing team members to







## OUR HERITAGE

# Remembering Vietnam 1: Tactical Photo Reconnaissance

BY DR. GARY E. WEIR

### On the 50th anniversary of the first direct

American military involvement Vietnam, the Department of Defense has called upon our country to remember with respect and gratitude those who served in Southeast Asia. For the generation that came of age in the 1960s, its constant presence became a formative experience—politically, socially and culturally.

Responding to Secretary of Defense Dr. Robert M. Gates' decision to remember those who served, the next six issues of *Pathfinder* will explore in these pages various aspects of this conflict and its role in shaping what would become the National Imagery and Mapping Agency and the National Geospatial-Intelligence Agency.

With 50 years' hindsight it appears the longevity of our presence in Vietnam and its gradually increasing strategic importance led to refinements in our technologies and our tradecrafts. Indeed, the number and proficiency of Vietnam era photo interpreters and their often burning desire to go beyond mere reporting to explaining what they saw in the images laid the groundwork for the leap many soon made from photo interpretation to imagery analysis. The length of the war and the challenging landscape also contributed to a significant improvement in tactical reconnaissance techniques and photographic collection systems.

In October 1961 President John F. Kennedy dispatched a delegation to South Vietnam led by Gen. Maxwell Taylor. The delegation arrived in Saigon and quickly appreciated the critical need of the Vietnamese republic for support and reform. Taylor suggested introducing American troops to train the Army of the Republic of South Vietnam. To get over the thorny political issue of an American presence in Vietnam, he suggested composing a relief task force to help the Saigon government address the results of a recent Mekong River flood that ravaged a good part of southwestern South Vietnam.

Taylor's suggestion to the president gave the latter the option of inserting 6-8,000 troops, assigning them humanitarian tasks and extricating them as desired. According to historian Phillip B. Davidson, Taylor observed that "we can phase them into other activities if we wish to remain longer."

While Taylor's final suggestions sketched an even broader and more ambitious commitment, the flood activity did enable the U.S. Air Force to move more advanced reconnaissance aircraft into South Vietnam. The government of Thailand gave its approval in October 1961 for the U.S. Air Force to station the more capable RF-101C Voodoo reconnaissance aircraft within its borders to overfly both Laos and South Vietnam. The 15th and 45th Tactical Reconnaissance Squadrons both had RF-101Cs, and four aircraft from the latter squadron flew into Don Muang near Bangkok under the name Task Force Able Mable.

For the reconnaissance version of the Voodoo, Southeast Asia presented familiar territory. The nationalist Chinese air force used 101Cs for brief sorties into mainland China in the late 1950s. These aircraft also found themselves at Clark Air Force Base in the Philippines in support of the American response to the Chinese in the Formosa Straits crisis and the threat against the islands of Quemoy and Matsu.

Shortly after arrival in Thailand, 101Cs from the 15th TRS found their way to Tan Son Nhut near Saigon in South Vietnam to photograph the Mekong flood damage. In addition to the humanitarian work, the reconnaissance squadron also imaged targets in Laos, like the Plain of Jars, and portions of the Ho Chi Minh Trail. The forward oblique cameras on the aircraft took the flood images while the military photos came from a KA-1 camera with a 36-inch focal length. The camera performed very well at high altitudes and used 9x18-inch plates, producing those large format images very much

in demand among the photo interpreters. Crews downloaded the cameras at night to disguise covert activity conducted in Thailand and South Vietnam. On Oct. 23, 1961, one reconnaissance mission over the airfield at Tchepone revealed the Soviet effort to resupply the Pathet Lao and the North Vietnamese by dropping supplies by parachute from Il-28 bombers.

By Nov. 18, the Able Mable Task Force at Tan Son Nhut created Operations Location Number 2, the opposite point to Don Muang in Thailand. Reconnaissance missions would land in Vietnam, drop their film, reload for another mission and perform that mission on the return trip to Don Muang. At first just a temporary tasking of 30 days duration, Able Mable quickly became permanent due to the critical nature of the information provided by the missions. The 101Cs and the pilots rotated in and out of the 45th TRS every six weeks, and from May 1962 the 15th TRS took over that responsibility.

Eventually the two squadrons exchanged these responsibilities every six months. They regularly used the KA-1 and KA-2 cameras and, for some missions, instruments with 24-or 26-inch focal length replaced the oblique cameras in the second camera bay in the aircraft. However, as early as 1961, the possibility remained that the T-11 precision mapping camera or the K-18 strip camera could emerge as possible necessary alternatives.

In an early effort to develop a night capability, two RF-101s formed the Toy Tiger Program, which operated out of Hill Air Force Base in Utah and Kadena Air Base on Okinawa. Technical experts modified the aircraft's right drop tank to fire the M-123 type photographic flash. Each Voodoo also carried a Doppler navigation system, APN-102/ASN-7 radars, and a pair of high-speed focal plane shutter cameras (KA-47s) set in the rear and mounted vertically, as well as four KA-45 cameras in the forward mounting positions.

*RF-101C Voodoo Reconnaissance Aircraft*  
DOD photo





While the aircraft and the imaging technology fit the mission perfectly, the terrain in Vietnam posed a very significant problem. Providing revealing photography of targets before and after any strike proved very difficult because of the thick jungle. The reconnaissance crews could achieve absolute accuracy only with great difficulty, which very often required multiple reconnaissance flights to satisfy the same need. The resources certainly existed, but the practice soon became dangerous because the enemy expected the 101Cs to return to evaluate the strike. When they did, the aircraft faced ever-increasing small arms fire. This drew some of Able Mable's first casualties.

In other ways the learning curve proved even steeper. Navigation often became difficult because very early in the American commitment in Southeast Asia, the USAF suffered from a short supply of accurate charts and maps. Meteorology presented another hurdle. The pilots operating from Don

Muang could rarely obtain reliable reports in Thailand on the weather over the course of the sortie track, and the regular low cloud cover made high-altitude imaging a very considerable task. In 1961, these circumstances began to define the nature of the air war and the reconnaissance problem in Vietnam and adjoining countries that would persist for over a decade.

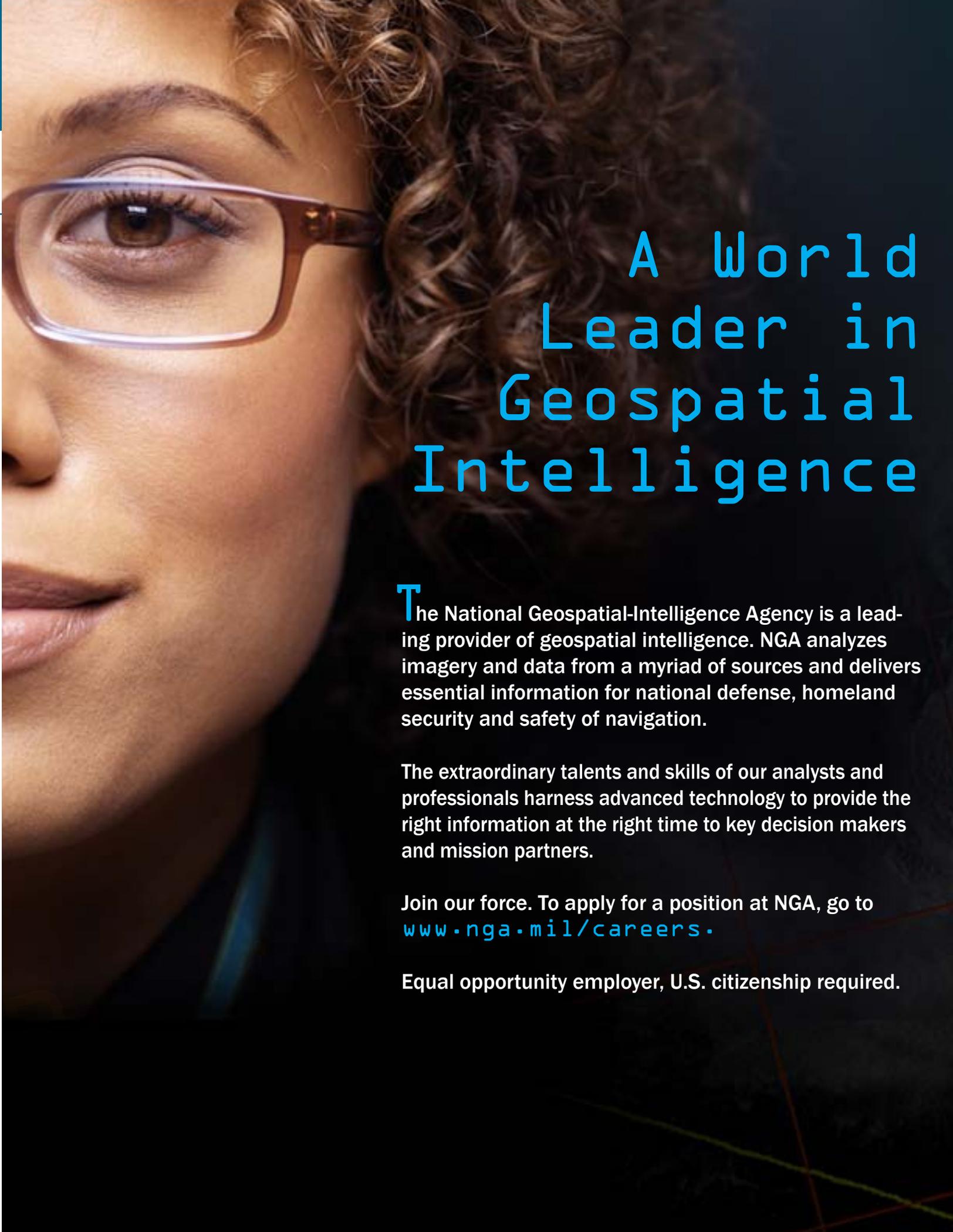
According to aviation chronicler Doug Gordon, in July 1963 Task Force Able Mable formally became part of the Air Force's 33rd Tactical Group at Tan Son Nhut and its complement of RF-101Cs increased. As Detachment 1, the task force took command of all reconnaissance aircraft in the Tactical Group. By that time, the 101Cs regularly flew five sorties each day, with one of their number standing by for unplanned emergency work. There would be many more sorties to come. **P**

■ Dr. Gary E. Weir is the NGA historian.

*A Soviet armored car moves along Route 7 in Northern Laos.*

DOD photo





# A World Leader in Geospatial Intelligence

**T**he National Geospatial-Intelligence Agency is a leading provider of geospatial intelligence. NGA analyzes imagery and data from a myriad of sources and delivers essential information for national defense, homeland security and safety of navigation.

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